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Effect of locking of photon echo signals in multichannel data recording

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Abstract

The effect of locking of a long-lived photon echo is investigated in the case where nonresonant laser radiation (a standing or traveling wave with an artificially created spatial inhomogeneity) serves as an inhomogeneous external perturbation, which results in random shifts or splitting of the initial monochromatic components of the inhomogeneously broadened line. The use of the mutual spatial orientation of the gradients of electric fields as an associative key of access to recorded information allows one to produce a large number of independent channels of data recording. It is demonstrated that the proposed scheme for recording and associative sampling of information has the advantage that, in each channel, information is recorded simultaneously at all optical centers (the whole inhomogeneously broadened resonance line), which does not decrease the intensity of the response from each channel. Moreover, the echo holographic information coded in the wavefronts of the exciting pulses can also be recorded in each channel, which does not affect the independence of individual channels of data recording. © 2008 Pleiades Publishing, Ltd.

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